II. *A Letter concerning the* Electricity *of* Water, *from Mr.* Stephen Gray *to* Cromwell Mortimer, *M. D. Secr. R. S.*

S I R,

THE Approbation the former Communication of my Electrical Experiments (*Tranſact. Numb.* 417.) to the *Royal Society* did meet with, by their moſt generous Encouragement, hath been a great Inducement to me to go on with them, to ſee what farther Diſcoveries I can make upon the Subject of this Species of Attraction. I ſhall at preſent communicate only two Experiments; the firſt ſhewing that Water may have an Attractive Vertue communicated to it from an Electrick Body; the other, that Water is not only attracted by the Tube, or any other abſolutely Electrick Body, but that this Attraction is attended with ſeveral remarkable Circumſtances.

I. In the former Account of my Experiments, I deſcribed the manner of communicating an Attraction to a Bubble of ſoaped Water; but I have now found, that even *a Body of Water receives an Attractive Vertue, and alſo a Repelling one, by applying the excited Tube near it, after the ſame manner as ſolid Bodies do.* To perform this Experiment, I cauſed a wooden Diſh to be turned, with a Screw-hole at the Bottom, but not ſo far as to come through the Wood: This was ſcrewed on to the upper End of one of the Stands I have mentioned in the other Experiments, the other Top being taken off: The Diſh was about four

four Inches Diameter, and one Inch deep. Then the Stand was ſet on a Cake of Roſin, or a Plate of Glaſs, or the Brims of a Drinking-Glaſs, or of a Cylindrick one, ſuch as are uſed for Water Glaſſes. The Glaſs muſt be firſt warmed, then the Diſh being filled with Water, the Tube rubbed, and moved both under the Diſh and over the Water three or four times, without touching them. After it has been excited, not only the Diſh, but the Water alſo, becomes Electrical; and if a ſmall Piece of Thread, or a narrow Slip of thin Paper, or a Piece of Sheet-Braſs, commonly called Tinſel, be held over the Water in an horizontal Poſition, within about an Inch or ſome times more, any of the ſaid Bodies will be attracted to the Surface of the Water, and be repelled, but not ſo often as by Solids. If a pendulous Thread be held at ſome Diſtance from the outſide of the Diſh, it will be attracted and repelled by it many times together with a very quick Motion, but not at ſo great a Diſtance as when the Diſh is empty.

II. *An Experiment ſhewing, that Water is attracted by the Tube, and that the Attraction is attended with ſeveral remarkable and ſurpriſing* Phænomena.

This Experiment being to be made with ſmall Quantities of Water, I at firſt made uſe of ſome of the Braſs Concave little Diſhes in which I formerly ground Microſcopes; but have ſince cauſed to be made a more convenient Apparatus, which conſiſts of a ſmall Pedeſtal of about four Inches and a half long, the Baſe of Ivory about two Inches Diameter. Upon the upper End, as in the larger Stand, there is a Screw, upon on which is ſcrewed on one of the little Diſhes, which are made of Ivory: Of theſe I have ſeveral Sizes, from three Quarters to one Tenth of an Inch Diameter. When any one of theſe little Veſſels is filled with Water, ſo as that it may ſtand above the Brims of the Cup, and has acquired a Spherical Surface (as it will do in the ſmalleſt Cups) let it be ſet on the Table with the little Stand to which it had before been ſcrewed, or, which is better, upon the larger Stand mentioned above, the great Diſh being taken off, and the ſmall plain Top ſcrewed on; being thus prepared, let the Tube be excited, and held over the Water at the Diſtance of about an Inch or more. If it be a large Tube, there will firſt ariſe a little Mountain of Water from the Top of the Drop, of a conical Form, from the Vertex of which there proceeds a Light (very viſible when the Experiment is performed in a dark Room) and a ſnapping Noiſe, almoſt like that when the Fingers are held near the Tube, but not quite ſo loud, and of a more flat Sound: Upon this immediately the Mountain, if I may ſo call it, falls into the reſt of the Water, and puts it into a tremulous and waving Motion. I have now a few Days ſince repeated this Experiment in the Daytime, where the Sun ſhined: I perceived that there were ſmall Particles of Water thrown out of the Top of the Mount, and that ſometimes there would ariſe a very fine Stream of Water from the Vertex of the Cone, in the manner of a Fountain, from which there iſſued a fine Steam, or Vapour, whoſe Particles were ſo ſmall as not to be ſeen; yet it is certain that it muſt be ſo, ſince the under Side of the Tube was wet, as I found when I came to rub the Tube again; and I have ſince found, that though there does not always

always ariſe that Cylinder of Water, yet there is always a Steam of inviſible Particles thrown on the Tube, and ſometimes to that Degree as to be viſible on it. When ſome of the larger Cups are made uſe of, they are to be filled as high as may be without running over: The Surface will be flat about the middle Part, but when the Tube is held over it, the middle Part will be depreſſed into a Concave, and the Parts towards the Edge be raiſed; and when the Tube is held over againſt the Side of the Water, the little conical Protuberance of Water iſſues out with its Axis horizontally, and after the crackling Noiſe, returns to the reſt of the Water, and ſometimes there will be thrown out of it ſmall Particles of the ſame, as from the ſmaller Portions of Water above mentioned. I am,

SIR,

The Society's, and Your moſt

Charter-Houſe,
Jan. 20, 173½.

Obedient Servant,

STEPHEN GRAY.

III. Upon opening the Body of a young Country Girl, dead of a Conſumption, I found her Lungs ſupurated in many Places, and a *Stricture* in the middle of the Stomach, dividing this *Viſcus* into two Bags. This Stricture appeared to have been of ſome Standing, and likely to have occaſioned ſome Difficulty in Digeſtion; but upon Enquiry, her Miſtreſs and Fellow Servants ſaid, that her Appetite and Digeſtions were natural, and that ſhe had continued in a good Plight, till upon coming to *London* ſhe contracted a Cough, that had brought on the Conſumption.

FINIS.

ADDENDA Page 230.

THE laſt Experiment was repeated with hot Water; when the Water was attracted much ſtronger, and at a much greater Diſtance: The Steam ariſing from the Vertex was in this Caſe viſible, and the Tube was ſprinkled with large Drops of Water. I tried the Experiment in the ſame Manner upon Quickſilver, which was likewiſe raiſed up; but by reaſon of its great Weight, not to ſo great an Height as the Water: The ſnapping Noiſe was louder, and laſted much longer than in the Water.

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